WORK STATUS REPORT

Job No. 6509

Period: July 1 through July 31, 1967

by

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August 21, 1967

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INTRODUCTION

This progress report covers the period from July 1 through July 31, 1967. The work described - Low Gamma Reversal Process - is a continuation of work begun under a previous contract, which terminated on June 30, 1967.

PROGRESS DURING PERIOD

The investigation of the possibility of using tertiary-butylamine borane (T-BAB) as a fogging agent was continued. In addition, the clearing bath formulation, primarily the thiosulfate concentration therein, was varied along with the length of time it is applied to the film. Preliminary tests were performed in which the T-BAB concentration was varied from 0.05 to 0.10 gram/liter, the sodium thiosulfate concentration was varied from 10 to 20 grams/liter and the clearing bath application time ranged from 1 to 3 minutes. These tests indicated that D_{min} increases and gamma in the reversal decreases as the T-BAB concentration is increased. An instability of the first developer was also observed, with the gamma decreasing upon continued use of the developer for a given processing condition.

Tests were performed to determine what concentration of the first developer agents yielded the most repeatable results at the desired gamma. In the original developer formulation hydroquinone and Phenidone were present in concentrations of 0.5 and 1 gram/liter, respectively. By maintaining the 1:2 ratio of concentrations of these two materials, it was possible to achieve similar gamma values up to concentrations of 2 and 4 grams/liter, respectively. Concentrations of 1 and 2 grams/liter, respectively, improved the developer stability.

The processing sequence which has evolved from the research to date is presented below.

Step No.	Bath	Time (min.)	Total Time (min.)
1	Prewet (water)	0.5	0.5
2	First Developer	10	10.5
3	Stop (SB-5)	0.5	11
4	Bleach (bichromate-sulfuric acid)	2	13
5	Wash (water)	2	15
6	Clearing Bath	3	18
7	Fogging Bath	1	19
8	Second Developer (Phenidone)	3	22
9	Wash (water)	1	23
10	Fixer (rapid fix)	2	25
11	Wash (water)	5	30

Solution temperatures are maintained at 70° F.; continuous agitation is used, except in the washes.

Sensitometric results obtained with the process modifications described above are similar to those reported previously for light-activated reversals. The gamma of the negative image is 0.75-0.80 with the straight line portion of the curve having a length in excess of 2.5 log E units. The gamma of the positive is 0.65-0.70 with a straight line portion of about 2.0 log E units. The D_{min} of both is 0.25-0.30, and the D_{max} is greater than 2.0.

WORK PLANNED FOR NEXT PERIOD

Investigations will be made to determine the feasibility of combining Steps 6 and 7 (clearing and fogging baths) or Steps 7 and 8 (fogging and developer baths) into one bath to reduce the process cycle time.

Preliminary tests will begin to produce a monobath for the second developer and fixation stage. From a practical point of view a "go to completion" second developer is desirable since this would reduce the requirement for vigorous process control to the first three steps only, as in conventional negative working processes. The monobaths to be considered will include the fogging agent, the developer components - of varying activities to yield the three desired gamma products of 0.5, 1.0 and 2.0 - and the fixing agents to remove excess silver halide and other soluble silver salts remaining after the bleach.

FINANCIAL INFORMATION

The first financial report will accompany the next status report since the availability of this information necessitates a 30-day lag in its reporting.